This marine accident report is issued on 2 March 2012

Case number: 201107567

Front page: Excerpt from “Det Levende Søkort”
LILLY (www.fiskerforum.dk, photo: G. Vejen)
FRANK W (photo: The Danish Maritime Accident Investigation Board).

The marine accident report is available from the webpage of the Danish Maritime Accident Investigation Board www.dmaib.dk.

The Danish Maritime Accident Investigation Board

The Danish Maritime Accident Investigation Board is an independent unit under the Ministry of Business and Growth that carries out investigations with a view to preventing accidents and promoting initiatives that will enhance safety at sea.

The Danish Maritime Accident Investigation Board is an impartial unit which is, organizationally and legally, independent of other parties

Purpose

The purpose of the Danish Maritime Accident Investigation Board is to investigate maritime accidents and to make recommendations for improving safety, and it forms part of a collaboration with similar investigation bodies in other countries. The Danish Maritime Accident Investigation Board investigates maritime accidents and occupational accidents on board Danish merchant and fishing vessels as well as accidents on foreign ships in Danish territorial waters.

The investigations of the Danish Maritime Accident Investigation Board procure information about the actual circumstances of accidents and clarify the sequence of events and reasons leading to these accidents.

The investigations are carried out separate from the criminal investigation. The criminal and/or liability aspects of accidents are not considered.
1. SUMMARY

In the morning of 26 June 2011, a fishing vessel with two fishermen on board was on a WSW-course close to light buoy “No 1A” east of Skagen. The fishing vessel was bound for Skagen after having finished fishing in the northern part of the Kattegat. At the same time, a general cargo vessel was approaching light buoy “No 1A” on a SE-course bound for Halmstad in Sweden.

The two vessels observed each other shortly before the collision, but actions to avoid a collision were not taken sufficiently early to have any effect, wherefore the vessels collided.

The collision caused a severe leak in the fishing vessel, and approximately 30 minutes after the collision the fishing vessel sank. The two fishermen were taken directly on board a pilot vessel that had come to their assistance.

The cargo vessel had minor dents aft and was allowed to continue its voyage to the destination.

There were no injuries in any of the vessels.

This report does not contain any recommendations.

2. FACTUAL INFORMATION

2.1 Ship particulars

**Name of vessel:** FRANK W

Flag State/port of registry: Antigua & Barbuda / Saint John's
Call sign: V2DX8
IMO number: 9374674
Operator: Frank W GmbH & Co KG/Wieczorek Andre GmbH & Co KG
Vessel type: General cargo
Building material: Steel
Gross tonnage: 2,528
Year of build: 2006
Cargo: Steel coils

**Name of vessel:** LILLY

Flag State/port of registry: Denmark/Esbjerg
Call sign: XP 2625
Operator: Kim Mikkelsen and Hans Marius Mikkelsen, Esbjerg
Vessel type: Trawler
Building material: Wood
Gross tonnage: 35.5
Year of build: 1966
Cargo: Approximately 125 kg of fish
2.2 Voyage particulars

FRANK W:
- Last port of call: Ijmuiden (the Netherlands)
- Destination: Halmstad (Sweden)
- Voyage type: Short international voyage
- Crew on board (voyage): 7

LILLY:
- Last port of call: Skagen (Denmark)
- Destination: Skagen (Denmark)
- Voyage type: Voyage to and from fishing grounds
- Crew on board (voyage): 2

2.3 Marine casualty or incident information

- Accident: Collision with subsequent loss of vessel
- Date and time of incident: 26 June 2011 at 07.38 LT
- Position of incident: 57 43'6 N / 010 51'9 E
- Category of sea area: Open sea
- Consequences (cargo vessel): Minor damage/indents
- Consequences (fishing vessel): Lost
- IMO accident classification: Very serious
- Weather conditions: Wind WSW 5 m/s. Sea 0.3 m. Current SE-going 0.9 knots. Visibility 7 nm

2.4 Shore authority involvement and emergency response

- Involved parties: Skagen Pilot Station and Skagen lifesaving station
- Resources used: Pilot vessel SKAWPILOT II and rescue vessel LARS A KRUSE
- Actions taken: The pilot vessel recovered the two fishermen. Subsequently, the rescue vessel recovered the released life raft from the sunken fishing vessel.
3. NARRATIVE

3.1 The general cargo vessel

The general cargo vessel departed Ijmuiden in the Netherlands at 13.15 LT on 24 June 2011 bound for Halmstad in Sweden. From Skagen the voyage was planned to follow “Route T”. On 26 June 2011 at 07.00 LT, the vessel reached the planned waypoint (WP) north of the Grenen at Skagen (WP position 57°47'906N/010°42'377E), and the vessel changed its course to the new planned course of 132° T. This course would bring the vessel close to the light buoy “No 1A” in “Route T”. The main engine was on full ahead, corresponding to a speed through the water of approximately 11 knots.

When the north cardinal bouy at Skagens Rev was abeam to starboard, the vessel turned slightly to starboard in order to give way to two other vessels. When the situation with these two vessels was cleared, the general cargo vessel turned port to a steered course of 130° in order to return to the planned course (see figure 1).

Figure 1: The track of the general cargo vessel from WP north of Skagen to the position of the collision (excerpt from “Det Levende Søkort”, Danish chart no. 101).
Approximately 2.6 nm from light buoy “No 1A”, two small radar echoes were observed on the cargo vessel. The position of these two radar echoes was almost the same as that of light buoy “No 1A”, and the echoes were interpreted as being the buoy and a false echo from the buoy, respectively. When the crew on the cargo vessel’s bridge tried to observe the echoes visually using binoculars, nothing could be seen due to the rising sun, which was still low over the horizon and created severe reflections on the water in the sector of the observed radar echoes. None of the radar echoes were plotted as the bridge crew on board the cargo vessel considered the echoes as being echoes from buoy “No 1A” and a false echo from the buoy.

At a distance of approximately 0.5 nm, the fishing vessel was observed visually as it came out of the reflections made by the sun. The fishing vessel was observed on the port bow of the cargo vessel. It was observed that the fishing vessel was on a crossing course, and on board the cargo vessel it was evident that the two vessels would collide if no action was taken. From the cargo vessel, the speed of the fishing vessel was estimated as approximately 8 knots.
On the cargo vessel, the mode of steering was immediately changed to manual steering, and at approximately 07.37 LT the helm was put hard to starboard. When the helm was hard to starboard, the fishing vessel was observed through binoculars. Nobody was observed in the wheelhouse of the fishing vessel or on deck. From the cargo vessel, a large number (more than five) of short blasts was given by means of the ship’s whistle, but no reaction was observed on board the fishing vessel and still nobody was observed on board the other vessel.

When the fishing vessel was observed approximately abeam to port of the aft edge of the cargo hatches, the helm of the cargo vessel was changed to hard to port in an attempt to swing the vessel’s stern to starboard, thereby avoiding the collision. When the helm was hard to port, the fishing vessel was further observed from the port bridge wing.

The cargo vessel reacted slowly to the helm orders, and the desired turn to port did not commence before the collision occurred. The cargo vessel was hit in the port side on a level with the forward part of the accommodation (see figures 3 and 4).

3.2 The fishing vessel

The fishing vessel departed Skagen on 25 June 2011 at 19.00 LT in order to fish for lobsters in the area known as "Norden af Flakket", which is situated approximately 13 nm east of Skagen. The two fishermen on board had been running this kind of fishing since 1984.

The fishermen shoted the trawl at approximately 22.00 LT, and then one of the fishermen went below to rest. Sometime between 03.00 and 04.00 LT, while the vessel was still trawling, the watch was changed. The haul continued until 06.00 LT, at which time both fishermen were awake and the trawl was taken on board. The heaving in of the trawl took approximately 20 minutes, and the catch consisted of approximately 100 kg of lobster and 25 kg of other fish.

After having taken on board the trawl and making the vessel ready after fishing, the vessel departed from the fishing grounds bound for Skagen, while both fishermen were on deck sorting the catch. While the catch was being sorted, the vessel was steered using the autopilot and the speed was approximately 2 knots. This procedure was normal during the sorting of the catch.
The fishing vessel was not equipped with repeater monitors for radar and electronic seacharts, etc. on deck. In order to maintain a degree of look-out, the crew had a routine where one fisherman stepped up on a hatch cover at intervals from where the crewmember could look out.

At 07.15 LT, the crew had completed sorting the catch and one of the crewmembers went to the wheelhouse, while the other fisherman remained on deck to prepare the catch and load it into the cargo hold. As normal when the catch had been sorted, the speed was increased to 5 knots.

The fisherman in the wheelhouse observed the general cargo vessel forward of abeam to starboard at a distance of approximately 3 nm. On board the fishing vessel, the cargo ship was not observed further or plotted on the radar, but when first observing the cargo vessel it seemed that this vessel would pass ahead of the fishing vessel.

After having observed the general cargo vessel, the fisherman in the wheelhouse went on deck to tell his colleague that he could call out when he needed help with putting the catch in the hold, as experience had shown that this was difficult to do alone. While both were on deck, the fishermen suddenly heard the whistle from the cargo vessel, and when they looked up they saw the bow of the other vessel.

One of the fishermen immediately ran to the wheelhouse and changed the pitch of the propeller to full astern without reducing the revolutions of the engine. The fisherman knew that, during such a manoeuvre, the stern of the vessel would swing out to starboard and he hoped thereby to be able to turn his own vessel to avoid or soften the collision. The fishing vessel reacted as expected, and the expected port turn was initiated. However, the manœuvre came too late to prevent the collision and the fishing vessel hit the cargo ship at an angle of approximately 45º.

The fisherman in the wheelhouse ensured that his colleague had not been injured by the collision. Then, both fishermen examined their vessel for damages. It was immediately apparent that the collision had caused a severe leak forward as the cabin was quickly filling with water.

All lifewests were stored in the cabin forward and therefore quickly became unavailable to the crew, but two immersion suits were kept in the wheelhouse aft. The fishermen prepared the liferaft, but before the raft was released the pilot vessel SKAWPILOT II from Skagen Pilot Station came to their assistance. Two lifewests were thrown from the pilot vessel to the fishermen on board LILLY, and both fishermen could then be transferred directly to the pilot vessel without getting wet.
3.3 Manning and navigational equipment on the bridge/wheelhouse

On board the general cargo vessel, an extra look-out was normally on the bridge from 22.00 in the evening to 06.00 in the morning. As the weather and visibility was considered good, this look-out had left the bridge at 06.00 and the duty officer was alone on the bridge when the collision occurred.

Among the navigational equipment of the cargo vessel were two 3 cm (X-band) radars with the ability to perform electronic and automatic plotting, an electronic chart display system and AIS. AIS data were presented on both radar and the electronic chart display system. At the time of the collision, one radar was in use and this radar was set to the 6 nm range scale.

Among the navigational equipment on board the fishing vessel were two 3 cm (X-band) radars and AIS type B. At the time of the collision, one radar was in use and set to the 3 nm range scale.

The AIS type B was switched on. The crew of the cargo vessel has explained that at no time was AIS data from the fishing vessel received on board the cargo ship.

The shore-based AIS system of the Danish Maritime Authority registered the AIS signals from the fishing vessel’s AIS type B (see figure 2). However, there were prolonged ‘dead periods’ when the signals from the fishing vessel were not registered.

Figure 5: Forward- and central part of the cargo vessel’s bridge (photo: DMAIB).
3.4 AIS equipment

Both vessels were equipped with AIS. The general cargo vessel was equipped with AIS type A. The fishing vessel was equipped with AIS type B.

On board vessels with a gross tonnage above 300, AIS type A equipment is mandatory. AIS type A transmits at an effect of 12.5 W.

Compared to AIS type A, AIS type B transmits at an effect of 2.5 W, which limits the range of the signals from AIS type B considerably. However, considering the limited range between the two vessels, it should be possible to register AIS type B signals without any problems on board the cargo vessel.

In order to obtain an understanding of the working principles and limitations of AIS type B equipment, the Danish Maritime Accident Investigation Board has contacted the then Danish Maritime Safety Administration (has since become part of the Danish Maritime Authority). Below is a summary based on the information received from the Danish Maritime Safety Administration:

Existing AIS type B equipment transmits on the basis of the principle that no transmission is made when it is registered that an AIS type A is in the process of transmitting (CSTDMA standard). The apparent effect is that signals from AIS type B equipment have a lower priority than signals from type A equipment.

If this apparent lower priority for an extended period of time should prevent an AIS type B in being allowed to transmit — and thereby being displayed on board surrounding vessels — the Danish Maritime Accident Investigation Board has been informed that it would take about 250 AIS type A equipped vessels within the AIS type B’s area of reception, which is not deemed to be the case at the time of collision.

With a large degree of certainty, any transmissions by means of the fishing vessel's VHF equipment would mean that the vessel’s AIS signals were ‘drowned’, while the VHF equipment was transmitting, thereby preventing AIS signals from being registered on board other vessels. This would be particularly true if the installation of the AIS type B equipment was made using a ‘splitter’ in which the VHF and the AIS was using the same antenna.

Finally, the quality of the installation of the equipment will have an effect on how well the AIS signals would be registered in surrounding vessels.

Due to the limited effect of AIS type B transmissions and the apparent lower priority compared to AIS type A signals, AIS type B equipment was originally meant primarily for pleasure craft and other ‘non-commercial’ users wishing to register other vessels’ presence in their area of operation.

Recognizing that in some sea areas a large number of AIS type B transmitters on board pleasure craft and other small craft can be expected, some manufacturers of AIS type A equipment has incorporated a facility to suppress the display of AIS data from type B transmitters in such areas. If this functionality is used, AIS data from AIS type B equipment will no longer be displayed. The intention of this functionality is to retain the clarity of the displays showing AIS data (i.e. radar displays, electronic chart displays, etc.) in areas with a dense traffic of small craft equipped with AIS type B equipment.
3.5 Directions for watchkeeping

The STCW Code, section A-VIII/2, part 3-1, paragraph 17, provides guidelines for the factors to be considered when planning the composition of the navigational watch on board ships. Paragraph 17.1 states that: "at no time shall the bridge be left unattended".

The STCW Code, section B-VIII/2, part 3-1, "Guidance on Keeping a Navigational Watch", paragraph 5.10 states that: "non-essential activity and distractions should be avoided, suppressed or removed".

The STCW Code does not apply to fishing vessels, but order no. 1758 of 22 December 2006 (the "Order on Watchkeeping on Ships") applies to Danish fishing vessels and section A-VIII/2 and section B-VIII/2 of the STCW Code are annexes to the order. Therefore, the guidelines on watchkeeping also apply to Danish fishing vessels.

3.6 International Regulations for Avoiding Collisions at Sea

Section 5 in the international 'rules of the road' stipulates that "every vessel shall at all times maintain a proper look-out by sight as well as by hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and the risk of collision".

Section 7 (a) in the international 'rules of the road' stipulates that "every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.

Section 7 (b) in the international 'rules of the road' stipulates that "proper use shall be made of radar equipment if fitted and operational, including long-range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects".

Section 7 (c) in the international 'rules of the road' stipulates that "assumptions shall not be made on the basis of scanty information, especially scanty radar information".

4. Analysis

4.1 Look-out – the general cargo vessel

At a distance of approximately 2.6 nm, the crew on the bridge of the cargo vessel observed two radar echoes in the approximate expected position of light buoy "No 1A". One of these echoes was interpreted as a 'false' echo originating from the buoy. The crew on the bridge tried to observe the source of the echoes visually through binoculars, but due to reflections from the low, rising sun nothing could be observed in the direction of the echoes. Hereafter, the crew of the cargo vessel took no further initiatives to visually observe the source of the radar echoes until, at a distance of approximately 0.5 nm, the fishing vessel was observed coming 'out of the sun' on the cargo vessel's port side.
It is the assessment of the Danish Maritime Accident Investigation Board that reflections from the sun was a contributing factor to the fishing vessel not being observed from the cargo vessel earlier.

The Danish Maritime Accident Investigation Board concludes that the crew on the cargo vessel's bridge, believing that the observed echoes both originated from the expected light buoy “No 1A”, did not take any further initiatives to either observe visually or plot the observed radar echoes.

It is the assessment of the Danish Maritime Accident Investigation Board that the crew on the bridge of the cargo vessel based the evaluation of the situation on scanty radar information.

4.2 Look-out – the fishing vessel
At the time of the collision, the fishing vessel was underway towards the port of Skagen and was not engaged in fishing.

A fisherman in the wheelhouse of the fishing vessel had observed the general cargo vessel. To the fisherman it appeared that the other vessel would pass ahead of his own ship, but no further observation or plotting of the other vessel on radar was conducted. After having observed the general cargo vessel, the fisherman left the wheelhouse to tell his colleague on deck that he could call when he needed assistance with the work.

During the stay on deck, the cargo vessel was not observed further until the fishermen heard the whistle of the cargo vessel and immediately before the collision observed the other vessel at close quarters.

It is the assessment of the Danish Maritime Accident Investigation Board that an effective look-out by sight and by hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision was not maintained.

It is the assessment of the Danish Maritime Accident Investigation Board that the procedures and routines used when conducting work on board the fishing vessel were not compatible with maintaining an effective look-out and the composition of a suitable watch when at sea.

4.3 AIS.
The AIS type B on board the fishing vessel was switched on and was transmitting data. The shorebased AIS system of the Danish Maritime Authority received AIS data from the fishing vessel only sporadically.

AIS data from the fishing vessel were not displayed on the cargo vessel's bridge equipment.

The Danish Maritime Accident Investigation Board is not able to assess the cause of the prolonged periods during which no AIS data were received from the fishing vessel's AIS type B equipment.

On the basis of the data gathered, the Danish Maritime Accident Investigation Board is not able to assess whether the lack of displayed AIS data from the fishing vessel on board the cargo vessel was caused by the crew, with or without their knowledge, having suppressed the display of data from AIS type B equipment.

It is the assessment of the Danish Maritime Accident Investigation Board that, had AIS data from the fishing vessel been displayed on board the general cargo vessel's radar
and/or electronic display units, it would have contributed to the observed radar echoes not being interpreted as echoes from light buoy “No 1A”.

5. Conclusions

- It is the assessment of the Danish Maritime Accident Investigation Board that reflections from the sun was a contributing factor to the fishing vessel not having been observed earlier by the cargo vessel.

- The Danish Maritime Accident Investigation Board concludes that the crew on the cargo vessel’s bridge, believing that the observed echoes both originated from the expected light buoy “No 1A”, did not take further initiatives to either observe visually or plot the observed radar echoes.

- It is the assessment of the Danish Maritime Accident Investigation Board that the crew on the bridge of the cargo vessel based the evaluation of the situation on scanty radar information.

- It is the assessment of the Danish Maritime Accident Investigation Board that due to the working routines used on board, a proper look-out was not maintained during passage.

- It is the assessment of the Danish Maritime Accident Investigation Board that, had AIS data from the fishing vessel been displayed on board the general cargo vessel’s radar and/or electronic display units, it would have contributed to the observed radar echoes not being interpreted as echoes from light buoy “No 1A”.